



STATUS OF *RAPALASELIRA* (MOORE) (LEPIDOPTERA: LYCAENIDAE) WITH NOTES OF VARIATIONS IN GENITALIA AND WING VENATION FROM THE NORTH-WEST HIMALAYA IN INDIA

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ABSTRACT

During the survey cum collection tours undertaken in the Himalaya in India, the Himalayan Red Flash, *Rapala selira* (Moore) has been reported from different localities between an altitude range of 1700 m to 2960 m in the state of Himachal Pradesh. The most important diagnostic taxonomic character, the external male and female genitalia have been investigated in detail and have been found showing certain variations. Similarly, wing maculation and venation too exhibit individual variations. The species has been found to be quite rare in Mussoorie and Kumaon in the Himalaya, from where it has been reported to be common by earlier workers.

Keywords: Genitalia, Himalaya, Lycaenidae, *Rapala selira*, taxonomic character

INTRODUCTION

The Himalayan habitats have not been adequately explored for documentation of Lycaenid butterfly diversity and our knowledge about the present status, distribution and taxonomic account of the Himalayan Lycaenidae is far from complete. In order to fulfill both these twin goals of habitat exploration and taxonomic updation, during the research project sponsored by Indian Council for Agricultural Research, New Delhi, an effort was made to explore the Lycaenid diversity dwelling in different parts of the Himalaya. The present study gives an updated taxonomic account of external genitalia and wing venation of *Rapala selira* (Moore) from the North-West Himalaya in India. The apical portion of valva in male genitalia and caudal margin of ductus bursae in female genitalia have been found to be variable. Moore (1882) and de Nicéville (1890) treated the species, *selira* Moore under the monotypic genus *Hysudra* Moore, whereas, Evans (1932) and Wynter-Blyth (1940) have considered it as a subspecies of *Rapala micans* (Bremer & Grey). However, according to Bridges (1988), the generic name *Hysudra* is a synonym of *Rapala* Moore and the species name *micans* is a subspecies of *R. nissa* (Kollar). Accordingly, a phenon comprising fourteen individuals (six males and seven females) collected from above localities in North-West Himalaya has been identified as *R. selira* (Moore) (Peile,

1937; Wynter-Blyth, 1957; Cantlie, 1963; Bridges, 1988). The material has also been compared with reference collections at Indian Agricultural Research Institute, New Delhi.

MATERIALS AND METHODS

Collection and Preservation

With an aim to sample the representative material, a number of survey cum collection tours were undertaken in various Himalayan localities in India and a variety of habitats such as forest areas, open grasslands, meadows, vegetation along streams and river banks besides cultivated fields were explored during faunistic surveys. The adults have been collected through random sampling by using butterfly sweeping net (ring circumference 37", pole length 35" and bag depth 31") and were killed using ethyl acetate. Subsequently, the specimen were pinned, stretched and preserved (Holloway *et al.*, 1992). For study of wing venation, the wings on right half of the body were removed, descaled, stained in alcoholic Eosine, dehydrated and mounted on glass slides in Canada Balsam. For dissection and preparation of the genitalia, the method proposed for the microlepidoptera (Robinson, 1976) has been adopted in the present studies. The diagrams of female genitalia have been

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drawn by using a graph eyepiece fitted in a Zoom Stereo Binocular Microscope. The representative material has been photographed both from the dorsal and the ventral sides, using a Nikon (FM-2) SLR Camera fitted with an 80 mm Zoom Lens.

OBSERVATIONS

Rapala selira (Moore)

Common name: The Himalayan Red Flash

Moore, 1874, Proc. zool. Soc. Lond. (1): 272 (*Deudorix*);

Cantlie, 1963, Lyc. Butts Revised: 152 (*Rapala*).

roana Fruhstorfer, 1916, Ent. Rundsch. 33 (5): 25 (*Rapala*).

Venation: Forewing (Fig. 1) with discal cell shorter than half of the wing length, vein Sc and vein R₁ approximating, vein R₄ missing, vein R₃ arising from middle of vein R₅, stalk of veins R₃+R₅ separated from vein M₁ at base, vein M₂ closer to vein M₁ at base than vein M₃, discocellulars incomplete, vein Cu_{1a} well before end cell; hindwing (Fig. 2) the discal cell shorter than half of the wing length, vein M₂ closer to vein M₁ than vein M₃, discocellulars complete, thin, oblique, vein Cu_{1a} slightly before end cell.

Male Genitalia: Symmetrical, large sized, depressed; uncus dumb-bell shaped with broad, widely separated lateral lobes, pilose; brachia long, slender, curved medially, gradually taper to long pointed apices; subscaphium broad, band-shaped; tegumen dorsally broad V-shaped, with apex pointing caudad; lateral windows narrow; vinculum V-shaped with thick proximal margin, upper portion broader; saccus short, obtuse, squarish, cephalad directed; valvae very small, ventrally conjoined for more than half of the length, free discal portion of each valva broad, variably narrowed towards apex, pilose; juxta absent; aedeagus (Fig. 6,7) long, slender, slightly curved at zone, suprazone almost double in length than subzone, apical portion slightly broader, with numerous spinule-like structures laterally, opening of vesica dorsal, vesica with two large, well sclerotized backwardly curved acute cornuti, bulbus ejaculatorius short, membranous, with large elliptical opening, ductus ejaculatorius enters dorsad, coecum short, rounded.

Female Genitalia: Genital plate not developed; ductus seminalis tubular with inverted funnel-like base, attached dorsally on ductus bursae at its junction with corpus bursae; ductus bursae broad, subcylindrical, dorsal surface well sclerotized, more or less sclerotized dorso-laterally at posterior end, produced above ostium bursae, ventrally membranous, inception at corpus bursae well marked; corpus bursae (Fig. 8) large, globular, membranous, a pair of lateral, thin, long, serrated, streak-shaped signa present, basal portion near ductus bursae grooved, not very membranous; apophyses anteriores short, spine-shaped; apophyses posteriores long, narrow, straight sclerotized rods with reflected tips; papilla analis (Fig. 9) elongated, well sclerotized, subconical with slightly bifid apex, pilose.

Forewing length; Male : 15-17 mm.
Female : 18 mm.

Material examined:

Himachal Pradesh: Banikhet, 1700 m, 22.IV.1996, 1 ♂; Dalhousie, 2200 m, 24.IV.1996, 2 ♂; Bakrota, 2036m, 25.IV.1996, 1 ♂; Kalatop, 2430 m, 26.IV.1996, 1 ♂; Khajjiar, 2750 m, 26.IV.1996, 1 ♀; Kupa, 2680 m, 15.VI.1996, 1 ♀; Rakcham, 2900 m, 16.VI.1996, 4 ♀; Kalpa, 2960 m, 18.VI.1996, 1 ♀; Puh, 2837 m, 23.VI.1996, 1 ♂.

Range: 1700-2960 m

Old distribution: Western Himalaya, Chitral to Kumaon, Shimla (Wynter-Blyth, 1947, 1957).

Larval food plants: Not known.

RESULTS AND DISCUSSION

Species specific nature of the male and female genitalia in many animal groups, particularly arthropods has been highlighted by Mayr (1963), Rentz (1972) and Eberhard (1985). Mayr and Ashlock (1991) while emphasizing the need of preparation of the genitalia carefully, have also pointed out that in insects genitalic structures are rather more important for species diagnosis than any other character. The significance has also been underlined by workers such as Bethune-Baker (1903), Chapman (1909, 1910), Toxopeus (1926), Riley (1929), Evans (1932), Stempffer (1937, 1967), Shirozu and Yamamoto (1956), Wynter-Blyth (1957), Burns (1970, 1987, 1992, 1996) Eliot (1973, 1992), Eliot and Kawazoe (1983), Bean (1988), Hirowatari (1992) and Wakeham-Dawson (1996). A careful examination of the collected sample reveals that the species is quite variable and exhibit several individual variations in attributes such as, alar expanse, discal patch on upperside of forewing (may be squarish or rounded), extent of submarginal band on upperside of the hindwing variable, forewing upper discocellular may be complete and hindwing upper discocellular may be incomplete or absent. The dissection of five males showing some other apparent variations also reveals variations in the apical portion of the valvae in the otherwise conspecific genitalia. The tip of valva may be rounded (Fig- 4) or pointed (Fig- 5) or intermediate (Fig- 3) between these two extremes. Similarly, the following variations have also been noticed after the dissection of an equal number of female individuals from four different localities. The caudal margin of the ductus bursae, which is sclerotized dorso-laterally may be notched in the middle with serrated lateral edges (Fig-10) or rounded with inconspicuously serrated lateral edges (Fig- 11) or notched in middle with minutely serrated but laterally produced edges (Fig-12) or produced in middle with serrated lateral edges (Fig-13). Except these minor variations, all other parts of both the male genitalia and the female genitalia are quite consistent in all the dissected individuals. Corbet (1939) while examining the male genitalia of the Malayan species of the genus *Rapala* has stated "in *Rapala*, the claspers (presently referred as valvae) are comparatively small and rather uniform in pattern, although there appears to be present a certain degree of individual and geographical variation in size and in the depth of the cleft." Such type of variations in the male genitalia have also been reported by Evans (1955)

and Rose and Sidhu (1996) in two Lycaenid species i.e., *Tarucus nara* (Kollar) and *Aricia agestis* (Denis & Schiffermüller) respectively. Explaining such variations in a Satyrid species, *Maniola jurtina* (Linnaeus), David (1993) has categorically stated that the genitalia are extremely useful taxonomic characters though they diverse rapidly during speciation in some cases. According to him, the most variable portion of the male genitalia is the discal and dorsal margins of the valvae.

The surveys also highlights the rarity of the adult individuals of this species in certain localities such as Mussoorie (Dehradun) and Kumaon, from where it has earlier been reported as common by workers like Mackinnon and de Nicéville (1898), Hannington (1910, 1910a), Peile (1937) and Shull (1962). However, the species has been reported to be common in above mentioned localities especially Dalhousie and Rakcham in North-West Himalaya.

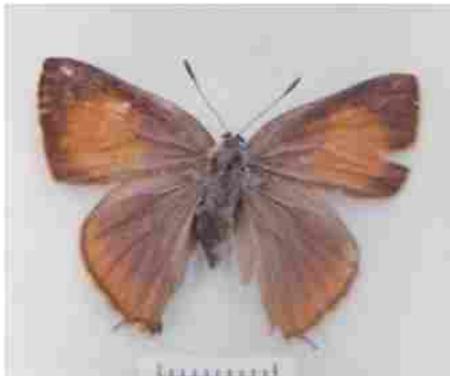
Plate 1



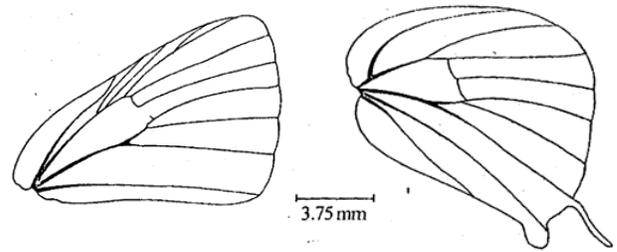
Male, upperside



Male, underside

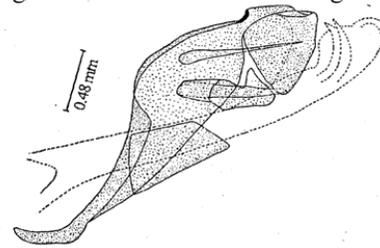


Female, upperside

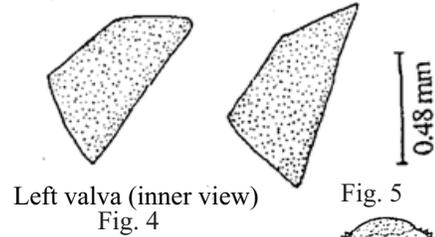


Venation of Forewing
Fig. 1

Venation of Hindwing
Fig. 2

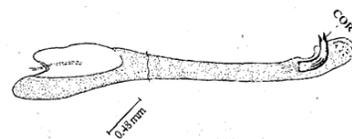


Male Genitalia (lateral View)
Fig. 3

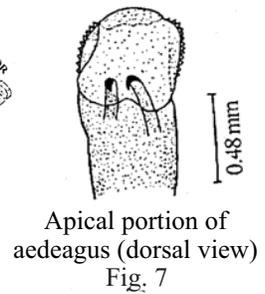


Left valva (inner view)
Fig. 4

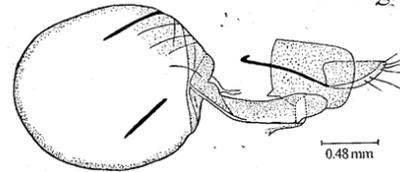
Fig. 5



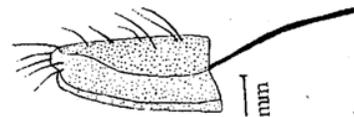
Aedeagus (lateral view)
Fig. 6



Apical portion of aedeagus (dorsal view)
Fig. 7



Female genitalia (lateral view)
Fig. 8



Papilla analis
Fig. 9

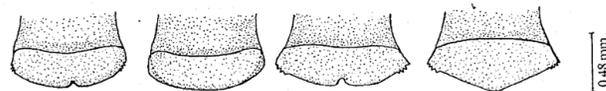


Fig. 10

Fig. 11

Fig. 12

Fig. 13

Base of ductus bursae

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